

Abstract**METHOD AND APPARATUS FOR MEASURING AND ESTIMATING OPTICAL
SIGNAL TO NOISE RATIO IN PHOTONIC NETWORKS**

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10 A WDM optical network comprising a plurality of nodes has a first apparatus for optical analysis at the site of a first optical amplifier upstream of the first node, a second apparatus for optical analysis at the site of a second optical amplifier at the downstream output of the first node, and a third apparatus for optical analysis at the site of a third optical amplifier further downstream of the first node, where knowledge of the optical signal to noise ratio (OSNR) is desired. The first, second and third apparatus are for measuring the signal level at frequencies both at and in-between the channel frequencies. The signal levels at the channel frequencies and between the channel frequencies at the first, second and third apparatus are used to derive the OSNR at the third apparatus. This enables the OSNR to be
15 measured accurately at any site in the network, using calculations in which noise shaping of the nodes can be factored in to the calculation of OSNR.

[Fig 1]